Ontario

Supply Chain Modernization in Ontario Health Care

Improving Patient Care, Enhancing Service Levels and Reducing Costs: A Report on the e-Supply Chain Project

2007

HEALTHCARE Supply Chain Network

OntarioBuys

2008-047317

Ontario

Supply Chain Modernization in Ontario Health Care

Improving Patient Care, Enhancing Service Levels and Reducing Costs: A Report on the e-Supply Chain Project

HEALTHCARE Supply Chain Network

OntarioBuys

November 2007

OntarioBuys is a program under the
Treasury Board Office of the
Ontario Ministry of Finance
777 Bay Street, 8th Floor
Toronto, ON M5G 2C8
416-327-1147

For more information, see
www.fin.gov.on.ca/ontariobuys
or e-mail
Ontario.buys@ontario.ca

© Queen's Printer for Ontario, 2007

Table of Contents

Foreword iii

Executive Summary 1

Introduction 4

- Case for Action 4
- The Challenge 4
- The Solution 5

Areas of Focus 6

- Source 7
- Request 11
- Procure 14
- Receive 16
- Inventory 18
- Payment 21
- Reporting 26

Appendices 28

- Appendix A: Glossary of Terms and Acronyms 28
- Appendix B: e-Supply Chain Project Sites 29
- Appendix C: Getting Started 32
- Appendix D: Enabling Technologies 35
- Appendix E: Suggested Wording for RFPs and Contracts 38

Foreword

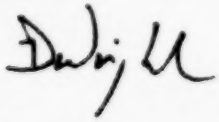
This report presents the results of the e-Supply Chain Project, a pioneering effort sponsored by the Ontario government to accelerate supply chain modernization in the province's health care sector. For senior hospital administrators, the report provides empirical proof that implementation of e-commerce and other supply chain leading practices can improve patient care, enhance service levels and generate financial savings. For materials management specialists, clinicians and other staff involved in supply chain processes, it details specific lessons learned that will help guide their own modernization efforts.

The e-Supply Chain Project grew out of a funding submission from Healthcare Supply Chain Network (HSCN) and six Ontario health care organizations to the Ontario government's BPS Supply Chain Secretariat. The Secretariat was formed in 2004 to help broader public sector organizations improve their back-office processes. Through its OntarioBuys program, the Secretariat is providing funding and advice to hospitals, school boards, universities and colleges to assist in consolidating and streamlining their supply chains.

In their submission, HSCN and the hospitals proposed to work together to pool their understanding of supply chain management as each separately undertook supply chain improvements suited to the hospital's needs. Their vision was that this collaborative effort would create a roadmap to supply chain modernization as well as numerous "live models" of automated supply chain processes that others could learn from.

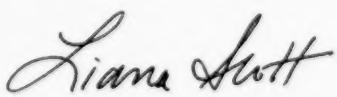
The Secretariat shared their vision and also their hope that the project's success would enhance patient care by encouraging adoption of supply chain leading practices across the Ontario health care sector. As the project participants discovered, the road to an efficient supply chain may have its twists and turns — but the destination is worth it.

To the project team: thank you for your effort and your vision. My thanks also to the talented OntarioBuys staff members who supported the initiative; in particular, Chris Terech, Iris Ko, Samarie Lumsden and Michael Chong.



Dan Wright
Assistant Deputy Minister
BPS Supply Chain Secretariat
Ontario Ministry of Finance

Cynthia Chesler
Co-Chair
Healthcare Supply Chain Network



Liana Scott
Co-Chair
Healthcare Supply Chain Network

Executive Summary

A wealth of evidence demonstrates that implementing e-commerce and other supply chain leading practices can improve patient care, enhance service levels and produce financial saving. Yet as late as 2005, many Ontario hospitals were not taking full advantage of the opportunities to generate these benefits. This report presents the results of a pioneering initiative by six leading health care organizations to accelerate the adoption of supply chain leading practices across the province. Their undertaking, which was sponsored by the Ontario government's BPS Supply Chain Secretariat, came to be known as the e-Supply Chain Project. Its principal focus was to introduce electronic tools and automated processes into key hospital supply chain functions, including requisitioning, ordering, invoicing, payment, contract management and reporting.

The six organizations that participated in the e-Supply Chain Project were:

- Healthcare Materials Management Services (HMMS)
- Hospital for Sick Children (SickKids)
- Hôpital regional de Sudbury Regional Hospital and Timmins and District Hospital (HRSRH/TDH)
- Shared Services West (SSW)
- Shared Healthcare Supply Services (Plexxus)[1]
- The Ottawa Hospital (TOH).

Collectively, these organizations represent 46 hospital facilities and more than $700 million in annual supply spending. The goal of the initiative, which began in early 2005, was to create a roadmap for supply chain modernization in Ontario health care and establish "live models" for other hospitals to learn from. This report contains numerous examples of specific benefits resulting from the introduction of e-supply chain components into the hospital supply chain.

The benefits include increased opportunity for nurses to focus on patient care, streamlined services and financial savings ranging from thousands to hundreds of thousands of dollars.

Benefit highlights

- Clinician response to the improvement initiatives has been overwhelmingly positive.
- Electronic procurement produced major time savings for all sites that implemented it; at SickKids, Materials Management redesigned their supply carts and increased the number of products replenished automatically by 33 per cent. The elimination of manual requisitioning processes was a key factor in reducing nursing and support-staff time spent on supply replenishment. The significant and attested benefits provide nurses with the opportunity to do what they do best: patient care.
- Reductions in inventory through efforts such as product standardization and improved warehouse management produced major financial returns, with HMMS generating annual savings of about $850,000.
- Improved contract management has generated annual savings of $532,000 for SSW.
- TOH transitioned more than 625 suppliers — representing about 60 per cent of its total supplier payments — to electronic funds transfer, resulting in 11,000 fewer manually processed payments per year.
- The e-Supply Chain Project's collaborative approach, which included nine months of consultation prior to the start of the implementation phase, helped the project sites develop common tools, avoid problems and set achievable goals.

[1] In April 2005, Shared Healthcare Supply Services (SHSS), which provided supply chain services to four major Toronto hospital organizations (Mount Sinai Hospital (MSH), University Health Network (UHN), Sunnybrook Health Sciences Centre and Women's College Hospital), signed on as one of the project sites participating in the e-Supply Chain Project. Subsequently, in March 2006, SHSS was acquired by Plexxus, a member-owned back-office service provider to 12 major health care organizations. Throughout this document, SHSS is referred to as Plexxus.

- Health care organizations located in both urban and rural parts of the province were successful in improving patient care, enhancing service levels and generating financial savings.

Appendix B of the report contains tips and suggestions from the project sites for managing a hospital supply chain improvement initiative. Topics covered include assigning a project lead; identifying opportunities for improvement; engaging stakeholders; and communicating with internal and external audiences.

Appendix D provides an overview of the technologies commonly used to create a modern, automated supply chain. Some of the key technologies are:

- an enterprise resource planning (ERP) system
- e-commerce software
- an e-commerce gateway
- an automatic identification system (bar coding or radio-frequency identification)
- a business intelligence reporting system.

Funding

The Ontario government supplied financial support for the e-Supply Chain Project based on a funding proposal from HSCN and six participating health care organizations. The funding was delivered by the Ontario government through its BPS Supply Chain Secretariat. The Secretariat was formed in 2004 to help broader public sector organizations improve their back-office processes.

The government funded the e-Supply Chain Project with a total one-time investment of $9.8 million. For each project site, the government's contribution was up to 85 per cent of the total cost, with the project

This chart summarizes the Ontario government's investments in the e-Supply Chain Project.

Project Site	Total Annual Supply Chain Spending (Millions)	One-time Investment[1] (Millions)	Savings Over 10 Years (Millions)	Payback on Investment (No. of years)
HMMS (London)	$190	$2.0	$19.4	1.0
The Ottawa Hospital	$128	$2.2	$12.0	1.8
The Hospital for Sick Children (Toronto)	$57	$2.5	$15.4	1.6
Shared Services West (Greater Toronto Area)	$179	$1.8	$16.3	1.1
Sudbury Regional/ Timmins District (Northeastern Ontario)	$64	$1.7	$8.2	2.1
Plexxus (Toronto)	$355	$2.6	$21.1	1.2

[1] The total investment for the project was $12.8 million with Ontario's share of the investment of $9.8 million and the hospitals' investment of $3.0 million.

site funding the remaining cost.[2] The length of time the sites required to recoup the investments ranged from 1.0 to 2.1 years, with five of the sites recouping the investments in less than 2 years. The average length of time the sites required to recoup the investments was 1.5 years.

In the 2007 Ontario Budget, the government projected that, through the combination of ongoing process savings generated by the e-Supply Chain Project and process and spend savings from other hospital supply chain improvement projects, total Ontario savings from health care supply chain modernization could reach $50 million annually by 2009–10.

Conclusion

The e-Supply Chain Project clearly demonstrated that modernization of key elements of the hospital supply chain can generate substantial benefits. These benefits include improvements to patient care and enhancements to service levels. Significantly, the project also showed that if supply chain improvements are implemented in the right way, they are also financially compelling. The investment is recovered through financial savings and other measurable benefits. For the six project sites in the e-Supply Chain Project, the implementation costs were relatively modest, and the project sites recouped their costs quickly.

[2] Each project site committed to funding a minimum of 15 per cent of the cost of the project. In some cases, project sites contributed more than 15 per cent through the use of internal staff and additional resources not captured in the original business case and any budget overruns.

Introduction

Case for Action

For years, private industry has been implementing new, enhanced e-supply chain technologies and leading practices that cut costs, while simultaneously improving service quality. By 2004, public health care organizations in Ontario, with a few notable exceptions, were falling behind. Supply chains in this critical sector were too often inefficient in their operations, poorly coordinated and inadequately supported.[3] Catching up would clearly require hard work and long-term commitment. But as the Ontario Hospital Association and Efficient Healthcare Consumer Response had argued in their 2001 Task Force Report on Supply Chain Management, "Improving Supply Chain Management for Better Health Care," the payoff would be worth it. Findings from the report included:

- Patients would receive better care from nurses and other caregivers because supply chain leading practices reduce the amount of administrative work these critical front-line workers must perform.
- Ontario hospitals could save a minimum of $120 million annually through adoption of leading practices that streamline the handling of goods, reduce inventory and lead to increased purchasing discounts from suppliers.
- Use of leading practices would also decrease the incidence of medical error, particularly medication error, which would shorten the average length of stay in acute care hospitals.

The Challenge

Ontario hospitals come in all shapes and sizes — and so do their supply chain goals. This means every hospital faces a unique set of challenges in optimizing the methods it uses to plan, source, procure, move and pay for goods and services.

Adding to the complexity, every hospital begins its journey to enhanced supply chain efficiency from a different starting point. Hospitals all have established technology platforms that may or may not support the organization's future objectives; all have existing practices across the various components of their supply chains; and all have existing relationships with product suppliers that similarly have established technology systems and existing practices — not to mention their own business objectives and timetables for doing things.

Further, once a hospital sets out on the road to a more efficient supply chain, unexpected problems inevitably arise to serve as roadblocks. Common challenges include management changes, corporate reorganizations and new competing priorities. As well, staying on budget is a significant challenge when improvement initiatives involve high levels of collaboration, rebuilding and complex processes.

The BPS Supply Chain Secretariat had to keep these factors in mind during the development of its strategy for accelerating supply chain modernization across the Ontario health care sector. Through its OntarioBuys program, the Secretariat sought to encourage development of common practices and technology standards beneficial to all stakeholders in the sector. At the same time, the support it provided would have to give individual hospitals the flexibility they required to develop customized processes and systems that were right for them. It was often said that if supply chain transformation were easy, it would have already been done.

[3] Source: 2004 Ontario Budget

The Solution

The e-Supply Chain Project was a collaborative initiative by six Ontario health care organizations representing 46 hospital facilities. The organizations committed to modernizing their supply chains through the expanded use of e-commerce technologies and leading practices. Their goal was to create "live models" of automated supply chain processes that they and other health care organizations could learn from and replicate.

Collaboration

An intense, nine-month consultation process preceded the implementation phase. During monthly meetings and through numerous exchanges of information, the project sites identified the key opportunities for improving supply chain performance. The collaborative aspect of the process was critical. Each of the project sites shared its knowledge of supply chain processes and acquired valuable insights and learning from the others. As well, the project sites supported and encouraged one another. This helped them overcome barriers and stay the course until their improvement initiatives had been implemented.

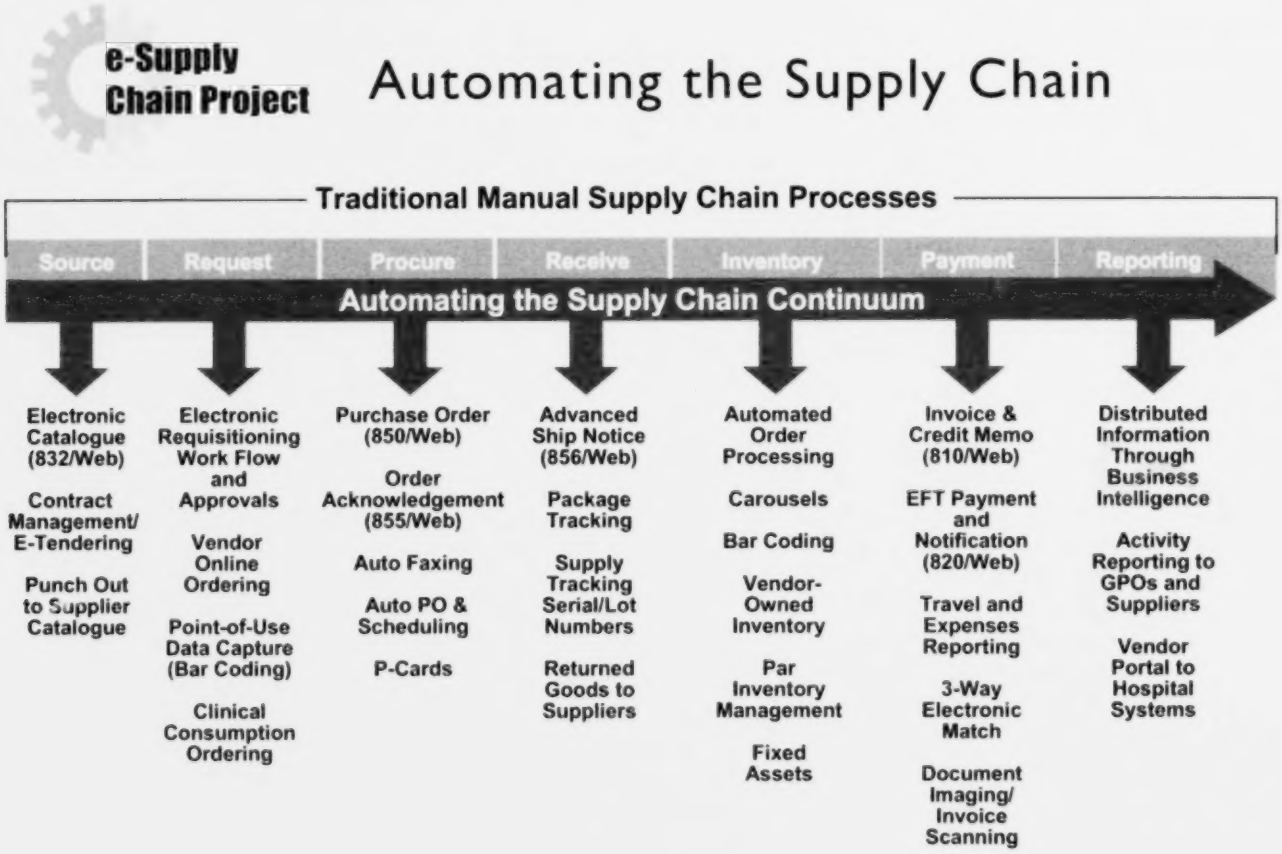
Knowledge base enhanced

This initiative has made a substantial contribution to the supply chain management knowledge base. Even hospitals that have already implemented advanced e-commerce technologies and practices can benefit from getting to know its results. The many lessons learned and measurable benefits identified represent a clear rallying cry to other Ontario health care organizations. Substantive and positive transformation is difficult, but it is achievable.

Areas of Focus

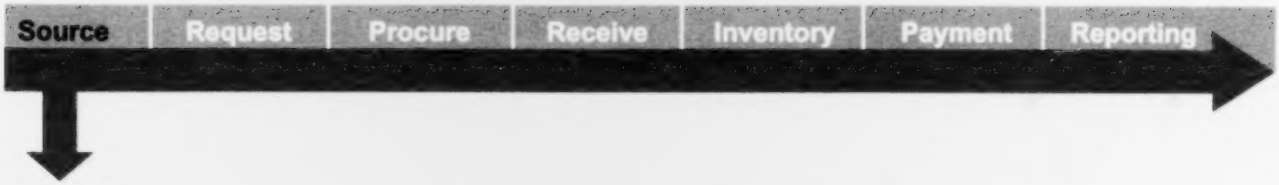
During the e-Supply Chain Project's consultation stage, the project sites identified more than 30 distinct elements in the automated hospital supply chain (see Figure 1).

Figure 1: The continuum of automated supply chain processes in a typical Ontario hospital.[1]



[1] Numbers in the figure, for example, (832/Web) refer to American National Standards Institute (ANSI) e-commerce standards.

Drilling down, the sites articulated the key characteristics of the various elements and the potential benefits that would result from implementation. At the end of this process, each site chose 10 to 16 supply chain elements that it would focus on and commit to implementing. Subsequently, during the implementation stage, the sites quantified the outcomes of their improvement initiatives and kept records of the challenges they encountered and their methods of solving them. The following section details the e-Supply Chain Project's principal areas of focus. For each, it provides implementation considerations, examples of benefits achieved and a selection of lessons learned.



Centralized Electronic Catalogue

What is it?

A centralized electronic catalogue, commonly referred to by hospitals as an item master, is a searchable database containing product and supplier information, including contract number, contract expiry date and contract price. Hospitals update the catalogue with new and revised information as it becomes available from suppliers.

How health care provider benefits

Hospitals realize cost savings because they are buying items from a list of approved products with pre-negotiated prices. As well, the ordering process is streamlined, eliminating time-consuming steps in the administrative process and reducing the opportunity for data error. The resources saved can be redirected to improving patient care and further streamlining hospital supply procurement processes.

Implementation considerations

The ability of a health care organization to derive benefits from a centralized electronic catalogue is highly dependent on the quality of data and information available that is synchronized with the supplier catalogue.

Limitations in current electronic data interchange (EDI) technology prevent hospitals from developing EDI-based centralized catalogues that incorporate all the data fields hospitals require. As a result, some hospitals are using workarounds such as Excel spreadsheets to capture the information from their suppliers. This information is subsequently uploaded by hospital staff to the hospital's centralized catalogue.

Hospitals also have the option of engaging third-party service providers to manage their centralized catalogue needs.

Data cleansing: Before undertaking data cleansing, hospitals should analyze their legacy product and supplier data to identify issues and pinpoint databases and information fields that need work. An important step in preparing the database for use in an automated system is to cleanse and synchronize the data. This involves correcting errors (including spelling errors) in the existing data, removing duplicate items and working with suppliers to identify the information fields required for products under contract.

Before

Hospitals received paper catalogues from their suppliers and manually updated their centralized electronic catalogue. Since hospitals have many suppliers, their catalogue collections were large and unwieldy. When hospital employees required information on a product, they searched through the basic information stored in the item master, or they had to physically locate a copy of the catalogue. Frequently, outdated versions of catalogues would remain in circulation, creating confusion and lack of certainty about the information. Also, since changes in product attributes and pricing can occur quite frequently, information in even the most current paper catalogue could quickly become outdated.

After

Hospitals import information on selected products from their suppliers' electronic catalogues into the hospital's centralized electronic catalogue. Suppliers regularly provide the information, automatically transmitting the information to the hospital for review and uploading to the hospital's centralized catalogue. When hospital employees require information on a product, they can quickly log onto the centralized electronic catalogue and call it up on screen — and they can be confident that the information is accurate and up to date.

Data standardization: In a paper catalogue environment, every supplier can have different policies and practices with respect to spelling style or use of abbreviations for naming and describing products and their attributes. This variability is not a concern because hospital staff can translate the information to the required hospital format during manual data entry. In an electronic environment, however, data entry occurs automatically, so a hospital and its suppliers must all adopt the same standards to avoid unnecessary data errors.

Benefits to date

- HMMS has improved its purchasing by eliminating more than 9,800 items from its centralized catalogue.
    - Data cleansing and synchronization of data with suppliers has reduced purchase order and invoice discrepancies, saving about one fulltime staffing equivalent or $47,000 annually.
    - On-contract spending has risen dramatically, from just 20 per cent in 2004 to about 92 per cent in March 2007.
- SSW implemented new tools and processes that support its efforts to consolidate its supplier base and, over time, will lead to increased product standardization on a regional basis. These improvements are allowing the organization to capture $100,000 a year in contract price discounts that it previously was not claiming.
- Plexxus has enormously improved catalogue quality at its participating health care organizations, with over 15,000 vendor items added, more than 11,000 vendor items deactivated and more than 23,000 vendor items updated over a six-month period.
    - Items covered by active contracts rose to 90 per cent, facilitating better contract compliance and easier requisitioning and approvals.
    - Batch loading of vendor items under contract was instituted at Sunnybrook Health Sciences Centre, greatly improving efficiency and accuracy.
- After setting the ambitious goal of being able to cleanse any vendors' item information through an automated upload process, SickKids' Materials Management team came together with their Information Services department to design and build a process that leveraged the capabilities of their ERP system while greatly reducing the manual effort involved in traditional item master file maintenance.

Lessons learned

- To date, only a handful of suppliers have developed the capability of sending catalogue information electronically. Consequently, hospitals that invest in centralized electronic catalogues should not expect to realize an immediate payoff. Prior to implementing this supply chain improvement, hospitals should consult their suppliers to determine their current status and future plans.
- Electronic catalogues created using EDI are limited in the information they contain. As a result, this technology solution fails to meet the needs of some hospitals.
    - Product information available through EDI includes supplier item number, item description, price and unit of measure; contract details available through EDI include contract number, start date and end date.
    - Examples of data fields that are currently unavailable through EDI include medical device licence numbers, latex content and bar code number. The absence of these data fields hinders automation of the data loading process. The updating of EDI standards and modifications to in-house systems would resolve this issue.
- Every hospital has different catalogue information preferences and needs. Some want supplier updates to contain only information that has changed. Others expect updates only on contracted items. The variance in requests from different hospitals makes it challenging for suppliers to meet all the expectations of every individual hospital. An important step in solving this issue is for the industry to adopt common

standards and formats for all data used in the hospital supply chain.

- Data cleansing is available for a fee from vendors, but hospitals may opt to do this in-house — particularly if the hospital has unusual or unique data needs that do not match vendors' standard service offerings.
- In some cases, the hospital's data cannot be fully synchronized with the supplier's data. For example, suppliers may be able to provide bar code information, but the hospital's materials management information system (MMIS) may not have a field to contain the data. Future software upgrades could resolve these issues.
- Poor data quality is a significant barrier to achieving many of the benefits that can result from implementation of centralized electronic catalogues and other supply chain automation tools.

Electronic Contract Management

What is it?

This automated function enables electronic storage of existing supplier and group purchasing organization contracts as well as online tendering of new contracts with automated bidding. It also monitors supplier contract compliance, tracks supplier rebates and automatically updates supplier pricing data in the hospital's item master.

How health care provider benefits

Hospitals are able to save time and money in virtually all aspects of contract management. Key benefits and features include:

- efficient, secure file exchange with suppliers
- controlled employee access to supplier contracts, including paper-based contracts that have been scanned into the system
- ability to generate electronic bidding documents from templates and receive electronic supplier bids
- ability to electronically track supplier rebates

Before

Contracts between hospitals and their suppliers were printed on paper and stored in filing cabinets or saved electronically in databases. If contract issues arose, purchasing staff would have to physically locate the paper document or retrieve an electronic copy from one of perhaps several databases. Due to the mishmash of practices, purchasing staff had difficulty keeping track of contract expiry dates. When contracts were approaching expiration, staff would send out paper-based tenders by e-mail or traditional mail. In response, suppliers would submit paper-based bids by traditional mail or courier delivery. Often, the current contract would expire before a new one could be prepared, resulting in pricing discrepancies and overpayments.

After

Hospitals keep copies of their supplier and group purchasing organization (GPO) contracts in easily accessible electronic databases. Purchasing staff use an automated contract management system to view contract details, monitor supplier contract compliance and track supplier rebates. Programmed alerts signal that a contract is about to expire, and the system can proactively prepare a new contract for approval. Tendering and bidding also take place online. Using template documents, purchasing staff quickly and accurately generate tenders and post them to password-protected areas on the system. Suppliers log on, view the tenders, and draft and submit their bids.

- ability to create business intelligence reports on a timelier basis for use in evaluating contract compliance and supplier performance
- improved ability to identify opportunities for contract savings and prioritize spending
- improved ability to manage employee workload related to supplier contracts through features such as advanced e-mail notification of approaching contract expiration dates

- an online repository of template requests for proposals and contracts
- an online glossary of terms and definitions commonly used in tendering contracts.

Implementation considerations

Some health care providers may prefer not to — or may be unable to — host a contract management system on their in-house enterprise resource planning (ERP) system or MMIS. The reasons could include:

- planned changes to the hospital's information technology infrastructure;
- lack of internal expertise;
- data integrity issues;
- lack of system functionality currently available.

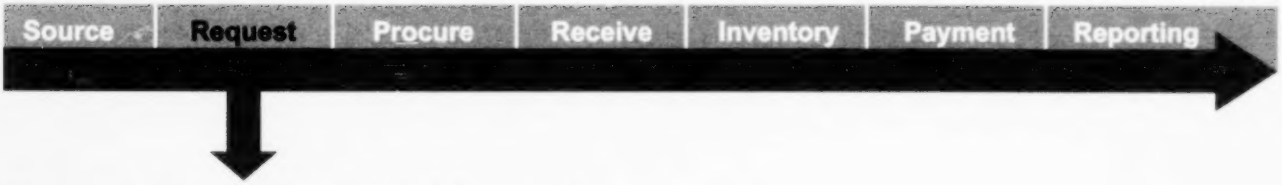
Many suppliers lack the tools and processes to support electronic contract management. Hospitals have the opportunity during negotiations of new product contracts to stipulate that the successful bidder commit to implementing this capability. (See Appendix E for suggested contract wording.)

Benefits to date

- SSW has generated annual savings of $532,000 through improved contract management, with the expectation of additional savings to come from further vendor rationalization and product standardization.
- HMMS's on-contract spending has increased significantly, exceeding 90 per cent as of March 2007.
- Plexxus has implemented electronic contract management at all 12 of the health care organizations it serves. As of June 2007:
  - more than 3,000 supplier contracts had been loaded into the system;
  - 13 requests for proposals were sent out successfully within the first few months;
  - processing had been completed on 242 contract renewals totalling $12.2 million.

Lessons learned

- Clean, accurate data are critical to the successful implementation of contract management systems.
- Plexxus recommends assigning a team of employees with responsibility for ensuring the integrity of the data in both the item master and contract management system database.
- To reduce potential for error, HMMS suggests limiting the number of employees who are authorized to change information in the item master, such as product catalogue numbers and prices.
- Suppliers may require significant support from hospitals during the initial stages of implementing electronic tendering.
- To take full advantage of a new contract management system, a hospital might need to revise its existing work-flow processes. This could involve introducing entirely new processes appropriate for an automated environment.
- Contract management systems can be complex and difficult to master. As a consequence, end users may overwhelm the support team with a large volume of help requests. An efficient means of educating users is through information-sharing sessions led by the support group with active user participation.



Electronic Requisitioning and Approvals

What is it?
This online technology streamlines the process of ordering products and obtaining manager approvals. Hospital staff submit electronic requisitions that are automatically routed to obtain the appropriate approval according to user-defined rules.

How health care provider benefits
Electronic requisitioning is faster and more accurate than manual processes, and hospital staff can easily go online to check the status of orders, reducing the number of inquiries to the purchasing department. Other benefits include efficient access to product and supplier contract information as well as enhanced contract compliance.

Implementation considerations
For maximum benefits, electronic requisitioning should be combined with electronic purchase order and acknowledgement. This integration permits the requisition order to be converted to a purchase order and sent via an e-commerce gateway directly to the supplier. The supplier responds with an order acknowledgement that informs the customer of the order's status. To implement electronic requisitioning, hospitals can either add the capability to their MMIS (if the system will support it) or acquire it from an independent vendor as part of a suite of e-commerce functions.

Benefits to date

- SickKids has migrated from manual requisitions to 100 per cent electronic requisitioning. Additionally, more than 2,500 non-stock items have been added to the new supply replenishment system. Previously, these items required a nurse or administrative clerk to type a request and submit it to their manager for approval.
- TOH says implementation of electronic requisitioning has been a positive experience, citing improved data accuracy, streamlined ordering and an efficient, automated approval process.
  - The organization currently has 260 online web-requisitioners, representing 65 per cent of all TOH requisitioners.
- At HMMS, use of electronic requisitioning has grown from 35 per cent of total orders placed in 2004 to 85 per cent in 2006.
  - In pharmacy and laboratory services, handheld scanners have replaced manual recording

Before

Nurses searched for the product in the hospital's centralized electronic catalogue and completed a paper requisition form. Next, they tracked down the appropriate managers to obtain physical signoff. Finally, they sent the approved requisition to the purchasing department, where the information had to be re-keyed into an order form before being sent to the supplier for fulfillment. After sending their paper requisitions, nurses often placed follow-up calls or e-mails to find out when their order would be delivered.

After

Template requisition forms for products in the hospital's centralized electronic catalogue are stored in a computer database. Nurses select a template, type in the order quantity and route the document online for managers to access and approve. Once authorized, the electronic requisition routes automatically to the purchasing department, where staff quickly and easily convert it to an electronic purchase order and send it to the supplier. The status of orders is visible on the system, so after sending their requisitions, nurses can log on at any time to monitor delivery of the order.

of inventory and purchasing requests by technicians. As well, stores staff have increased their use of handheld scanners. In all, more than 1,000 employees are now using online requisition or handheld scanners to transmit orders automatically.

- The increased efficiency and accuracy of requisitioning across HMMS has resulted in savings of an estimated two fulltime staffing equivalents or $94,000 annually.
- Use of online requisitioning and handheld scanners has greatly reduced the need for faxing and photocopying of paper requisitions, generating annual savings of about $5,000.

- At some of Plexxus' participating hospitals, use of electronic requisitioning grew from five per cent at project inception to over 50 per cent by June 2007.
  - The electronic requisitioning system now has more than 600 users generating over 1,500 requisitions per month.
  - The system produces average savings per requisition (including approvals) for the requisitioner of 6 to 20 minutes and average savings per requisition processed by buying staff of 6 to 10 minutes.

Lessons learned

- In an electronic requisitioning environment, hospital staff tend to make more frequent requisitions, with individual requisitions on average containing fewer product lines. Consolidation of requisitions should be encouraged to avoid overwhelming the order department and to create downstream efficiencies in areas such as receiving, warehousing, invoicing and accounts payable.
- Rush orders sent via electronic requisitioning may fail to catch the attention of order department staff. Nurses and other end users should be provided with a communications tool, such as e-mail, for use in alerting the order department to the existence of orders requiring immediate attention.
- Staff engagement is critical to the success of electronic requisitioning initiatives. Hospitals should develop plans for providing upfront and ongoing end-user training to help build awareness and support; hospitals should complement the training with monitoring to assess compliance.
- Electronic requisition systems should allow nurses to update their own requisition templates with data from the hospital's centralized product catalogue. This provides them with greater control over the requisition process and reduces the workload on supply chain staff.
- If multiple hospital employees are given the same user ID, it is difficult for materials management staff to track delivery to the requisitioner, or follow up with the person who placed the order.
- When hospitals migrate from manual to electronic requisitioning, their approval policies and processes may need to be revised. Electronic requisitioning provides the greatest benefit when employees use templates for common product requisitions. Retraining may be required from time to time to ensure that requisitioners are maintaining templates and using them consistently.

Clinical Consumption Ordering

What is it?

Clinical consumption ordering is an approach to inventory management in which consumption data is captured at point of use and forwarded to the materials management department in the form of an electronic requisition to facilitate replenishment orders. The data are stored to a database for use in case costing and other business intelligence analysis.

How health care provider benefits

Inventory is tracked in real time, and the system automatically places replenishment requisitions based on pre-set inventory levels. This process saves time, reduces inventory on hand and provides a mechanism for managing product obsolescence. As well, the hospital is able to conduct accurate, timely individual case costing, enabling it to make informed decisions about the types of services it delivers and how it delivers them.

Before

Among their many other duties, nurses were responsible for monitoring inventory levels of products in the operating room and initiating replenishment requisitions. The process involved manually counting the supplies; when an item needed replenishing, requisitions were created manually using paper-based requisition tools. Nurses were also responsible for recording consumption of non-stocked supply items in clinics and operating rooms during patient procedures.

After

The new system, which is based on electronic "preference cards," automatically recognizes the reduction of on-hand inventory when supplies are picked for an operating room procedure. There is no need to count stock or fill out requisitions. The system uses pre-configured inventory settings to determine when more stock is needed and automatically initiates an electronic requisition to the purchasing department.

Implementation considerations

Prior to implementing clinical consumption ordering, hospitals will need to update physician preference cards, which are difficult to maintain in a manual environment. In addition, a complete review of all products in use and their locations in storage will need to be completed.

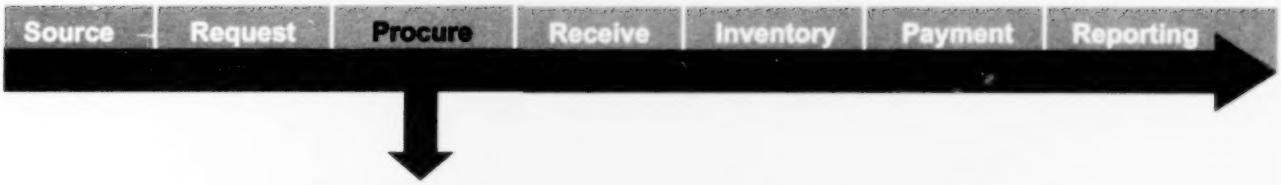
Clinicians and materials management specialists often use different terms and abbreviations in referring to the same products. A collaborative effort is needed to establish standardized descriptions.

Benefits to date

- Since Plexxus implemented electronic ordering in the medical imaging departments at UHN and MSH, an average of 300 order lines per month are being placed electronically, eliminating the need for faxing and re-keying of information and facilitating direct order feedback into the clinical system.
- At SSW, patient safety has increased as a result of bar code data capture at clinical point of use, which enables more accurate and efficient product tracking and product recalls.
- At SSW's Halton Healthcare Services hospital sites, staff have begun performing surgical case costing by procedure and surgeon, which is enabling the organization to gain a better understanding of its clinical expenditures.

Lessons learned

- When multiple software systems and/or databases are integrated in the creation of an automated clinical consumption ordering system, incompatibilities can arise that result in the need for some manual entry of the data. Future upgrades to the software systems may resolve these issues.
- In some hospital specialty areas, automated systems will not offer sufficient flexibility to capture the data needed for product ordering. For example, Plexxus found the volatile data requirements at the University Health Network's Animal Resource Centre to be a barrier to system implementation. Consequently, the decision was made to allow the centre's administrative team to order products directly from suppliers. Under this scenario, when implemented, invoice payments continue to be made through the hospital's accounts payable system.
- SSW found that clinical and supply chain staff must work openly and collaboratively to implement new automated systems for improving management of operating room resources. In addition, staff must be willing to rethink their roles and realign accountabilities.



Electronic Purchase Order

What is it?
Electronic purchase order is a fast, efficient means of creating and sending to a supplier the document that outlines the terms and conditions of an order.

How health care provider benefits
This process reduces the time that nurses and purchasing staff spend ordering products. It also reduces the likelihood of data error and decreases the total cycle time from purchase order creation to product shipment.

Before

Hospital staff created paper-based requisitions and forwarded them to the purchasing department for fulfillment. Purchasing staff then re-keyed the information into purchase order forms, printed them and sent them to suppliers by mail or fax.

After

Hospital staff create electronic requisitions and forward them to the purchasing department for fulfillment. Purchasing staff convert the requisition to an electronic purchase order in seconds and send it seamlessly to the supplier by EDI or the Internet.

Implementation considerations
See Technology Standards in Appendix D, Enabling Technologies.

Benefits to date

- As of March 31, 2007, TOH's newly implemented electronic purchase order system was returning benefits of about $1.2 million, of which almost half were in the form of direct administrative cost reductions. The cost savings and recovered employee time are being reinvested to improve patient care.
  - TOH is ordering products much more efficiently and accurately now that 27 of its top medical surgical suppliers — representing annualized spending of about $50 million, or about 80 per cent of total TOH spending on medical and surgical supplies — have connected to the system.
- SSW raised its annual volume of electronic purchase orders from fewer than 5,000 to more than 15,000, generating annual recurring savings of $50,000. To handle the increase in electronically transacted volume, SSW first had to overcome limitations in its MMIS. The hospital worked with its e-commerce provider to develop a purchase order acknowledgement (POA) discrepancy notification tool. This useful device is now available at no cost to all hospitals across Canada.
- Plexxus' hospitals have increased their volume of electronic purchase orders to more than 2,500 per month, representing $3.7 million in spending. A total of 40 suppliers have been activated, and electronic purchase orders now account for more than 35 per cent of total direct purchase orders sent.
  - A web portal has been developed that provides increased flexibility in viewing order status information and passing supplier exception notices back to hospital customers.
  - The increase in electronic transmission of purchase orders is saving Plexxus buyers 5 to 10 minutes per purchase order; the staff time that has been freed up to devote to other tasks represents a benefit of $15,000 to $30,000 in annual savings.
- At HMMS, 86 per cent of purchase orders are now sent to suppliers via EDI, XML or automatic fax; the improved efficiency is saving the

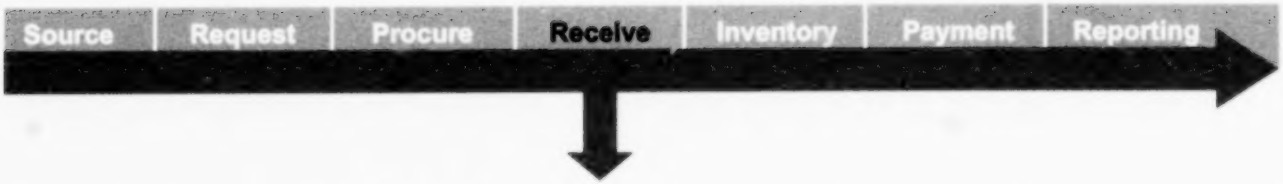
purchasing department about half a fulltime staffing equivalent, or $23,000, annually.

  - Nineteen per cent of purchase orders are now being generated automatically from electronic requisitions.
  - The expanded use of electronic purchase orders has increased staff productivity and efficiency, allowing more time for work on strategic improvements in the areas of product standardization, ordering, contract management and customer service.

- SickKids is transmitting electronic purchase orders to 15 of its largest suppliers and continues to expand this capability to other suppliers.
  - The adoption of e-commerce transactions has fuelled a cleaning of the more than 17,800 items in its centralized electronic catalogue, resulting in a marked decrease in purchase order-to-invoice match exceptions.
- In June 2007, SickKids issued 665 electronic purchase orders — this represented a 49 per cent increase over the six months from January 2007. The roll-out plan calls for five more vendors by December 2007.

Lessons learned

- For a hospital, setting up a new internal e-commerce system and testing purchase orders over a gateway with newly activated suppliers can be complicated and time consuming, principally because the technologies are unfamiliar and new procedures are often involved. However, once the hospital gets to know the software and processes, activations of new suppliers are straightforward.
- For new supplier activations, the bulk of the work is centred on cleansing the data in the hospital's central electronic catalogue to ensure accurate data are passed between the hospital and supplier. Some gateway vendors offer specialized tools and services that streamline the initial data-cleansing process and maintain clean data on an ongoing basis.
- Hospitals that require staff in different departments to have direct access to purchase order transaction data should use Internet-enabled technologies.
- When migrating from manual to electronic purchase orders, hospitals should review their existing processes and modify them appropriately. This will ensure they avoid problems and obtain the maximum benefits the technology offers. For example, e-commerce systems have built-in lag time, associated with the use of batch-processing technology, between when a hospital employee places an order and when the system forwards the order to the supplier. A second processing delay could occur at the supplier end. The total delay could be an hour or more. Manual orders placed by phone do not have such delays. Hospitals using electronic purchase order systems should arrange to make requests early for time-sensitive orders.



Centralized Surgical Warehouse

What is it?

Centralized surgical warehouse is a concept combining implementation of an off-site warehouse for operating room (OR) products with process changes that provide OR nurses with more time for patient care. Specifically, the hospital's supply chain specialists assume responsibility for the purchase, storage and distribution of OR products. At many hospitals, the OR nurses have traditionally handled these processes themselves.

How health care provider benefits

A 2004 study by Sullivan Health Care Consulting outlined the following benefits from the centralization and standardization of OR inventory:

- reduction of excess inventory;
- reduction of obsolete inventory;
- reduction of excessive vendor access to OR;
- reduction of product duplication;
- reduced clinical frustration;
- better access to products when needed;
- improved access to vendor-sponsored programs;
- reduction in staff time.

Implementation considerations

- Hospitals could save money and achieve higher service levels by working together to implement large-scale centralized surgical warehouses.

Benefits to date

- HMMS' implementation of a centralized surgical warehouse has generated significant benefits for OR nurses. Due to process changes associated with the introduction of the warehouse, supply chain specialists are now providing comprehensive and more reliable services related to ordering, purchasing and delivering OR products. OR nurses have substantially less responsibility for organizing and monitoring OR product levels. The nursing time recovered is being redirected to improving patient care.
- HMMS generated one-time savings of $250,000 in operating expenses, reduced inventory obsolescence by about $50,000 and cut warehouse labour costs by about one fulltime staffing equivalent.

Before

At most hospitals, the general warehouse was responsible for purchasing, storing and delivering OR supplies to the OR department. Often, OR nurses felt their patients' needs were underserved by this arrangement. The occurrence of shipment delays was all too common, causing the OR nurses to distrust the general warehouse's ability to deliver critical products on time. As a result, OR nurses routinely ordered more goods than they needed, storing the surplus on site for use in the event of shipment delays. This excess inventory generated unnecessary carrying costs and high levels of product obsolescence.

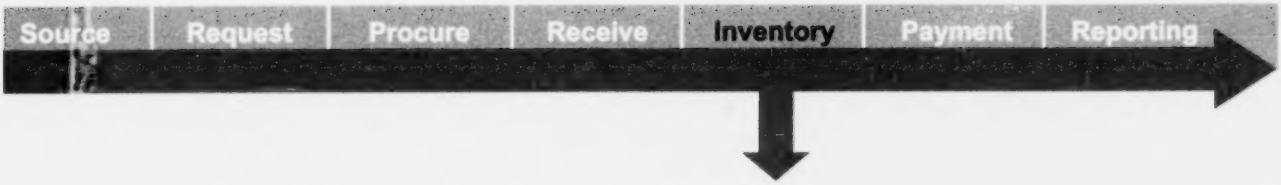
After

The hospital's new centralized surgical warehouse is meeting the expectations of OR nurses. Supplies are arriving on time and at the proper location. OR nurses now have confidence the hospital's supply chain specialists will support their efforts to provide patients with the best possible care. As a result, OR nurses have stopped ordering excess supplies, which means product waste is reduced. Since they no longer have to spend time worrying about materials management issues, OR nurses now have more time to spend attending to patients' needs.

- Additional labour savings of about two fulltime staffing equivalents were realized in OR and purchasing.
- OR space that was previously devoted to product storage has been put to other use.

Lessons learned

- The project team should include all stakeholders, including OR service clerks and inventory replenishment staff.
- Warehouse staff should have OR backgrounds and experience working with surgical supplies and inventory management systems.
- Materials management and OR staff should meet regularly to monitor product standardization, inventory obsolescence, inventory levels and service quality.
- Space must meet current Canadian Safety Association (CSA) standards.
- Warehouse management solutions should be implemented using wireless handheld scanners for order processing, stock put-away and cycle counting.
- Use of electronic requisitioning integrated to end users will deliver improved service levels and maximize the operational efficiencies of a centralized surgical warehouse.



Warehouse and Inventory Management Automation

What is it?
Warehouse and inventory management automation involves a complex mix of handheld scanners, customized software, bar code (or RFID) product identification technologies and changes to business processes. These technologies and processes combine to dramatically streamline the task of managing the hospital warehouse and product inventories.

How health care provider benefits
Leading automation practices in this area improve inventory accuracy, reduce product waste due to obsolescence and save staff time. Consumption and ordering data captured by the system can be used to plan and forecast more effectively and create more effective inventory and quota management policies.

As well, the product identification technologies implemented to improve warehouse management can be used to improve bedside medication verification, thereby enhancing patient safety.

Implementation considerations
The bar code scanner and associated software needs to have the flexibility to handle multiple bar code formats.

Hospitals may want to acquire portable computers and wireless networking technology to give their supply chain specialists the flexibility to manage inventory from almost anywhere in the hospital.

"Open-house" tours can be used to familiarize staff with new supply carts/bins and technologies prior to deployment in the nursing wards. SickKids employed this tactic in introducing its new point-of-use inventory replenishment system. As a result, staff were prepared for the eventual changes to their workflow, and the project enjoyed widespread support.

When introducing changes to inventory management, consider rolling them out in stages, beginning with low-risk functional areas. This approach will enable the project team to gain experience and develop a successful working model that can be extended to more complex functional areas.

Benefits to date

- HRSRH/TDH found that clinician confidence in supply replenishment processes increased after implementation of warehouse and inventory management automation. As a corollary, clinicians

Before

Upon receiving new shipments of supplies, warehouse staff opened each box, manually counted the items inside and recorded the data on a paper form. During annual inventories, staff counted every item in the warehouse and manually entered the data onto paper count sheets. All information recorded on paper was subsequently keyed into a computer database. Due to the manual nature of these processes, data errors were common, resulting in understocking errors that threatened patient safety and overstocking errors that led to product obsolescence and waste.

After

Data errors have been virtually eliminated from warehouse and inventory management processes. Warehouse staff use bar code readers to quickly and accurately count items in new shipments and manage supply levels. Automated processes determine when items need replenishing in the warehouse and generate electronic purchase orders that are forwarded suppliers.

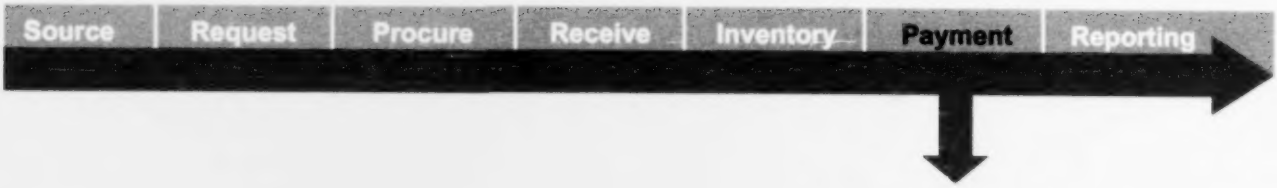
felt less need to manage inventory levels and were able to redirect the time saved to patient care initiatives.

- HMMS achieved workflow improvements, better reporting and better audit controls through implementation of wireless handheld bar code scanners in conjunction with a new warehouse management system.
  - This initiative generated total annual savings of $180,000.
  - Inventory accuracy has increased to 99.8 per cent (year-end physical inventory conducted in February 2007), generating an estimated $30,000 in annual savings through reductions in inventory obsolescence, discrepancies and shrinkage.
  - Increased accuracy and staff productivity will save between one and two fulltime positions, with annual savings of $40,000 to $80,000.
  - Enhanced staff productivity has also enabled HMMS to expand its hospital customer base, resulting in an annual revenue increase of about $125,000.
  - Savings on paper and photocopying costs amount to about $10,000 annually.
- SSW achieved a one-time savings of $725,000 in reduced inventory, exceeding its goal of $550,000; the savings resulted from implementation of leading warehouse and inventory policies and practices, including wireless handheld scanners and product bar codes.
  - As a result of these improvements, inventory management at SSW has shifted to a functional role, minimizing the need for clinical expertise and freeing clinical staff to focus on patient care.
- SickKids has improved service delivery through increased frequency of delivery (45 per cent), increased number of SKUs delivered (33 per cent more) and increased number of delivery locations (19 per cent) as a result of implementing an integrated, modular storage, replenishment and inventory management system, together with appropriate process changes.
  - The reduced administrative workload on nurses, allowing them to spend more time with patients, is valued at more than $2.7 million over five years.

Lessons learned

- To achieve full warehouse automation, the health care provider's materials management information system must be integrated with its warehouse management system.
- Inventory accuracy is improved through implementation of a cycle count process for daily balancing of transactions between the materials management information system and the warehouse management system.
- In multiple hospital organizations, it is important to select warehouse and inventory management solutions that are flexible and customizable, because every hospital has different existing technologies and process.
- When first working with universal product numbers (UPN), suppliers sometimes make the error of assigning a single UPN to a group of different products that have been packaged together for shipping. This creates the potential for confusion and further errors in the hospital's receiving department. Suppliers must be made aware of and adhere to standards for proper UPN usage. This is further complicated by the lack of one unifying set of standards for bar codes in the health care sector.
- Some suppliers have yet to adopt bar coding. Hospitals should encourage all suppliers to implement this important supply chain technology.
  - The more suppliers that use bar coding, the greater the opportunity for hospitals to benefit from improvements in this area.
  - Bar coding and handheld scanning technologies deliver maximum benefits when paired with wireless networking technology.

- A training program will help staff understand the changes to processes and workflows.
- At SickKids, staff training on proper use of the new supply replenishment system took only 15 minutes. However, this training was a key part of the hospital's efforts to promote the organizational change needed to support the new system. Specifically, the training helped build commitment among key stakeholders and end users, and ensured they understood the benefits and implications of the new system.
- SickKids opted for a supply replenishment system that was both bar code and RFID capable. This has proved to be a good decision. While the hospital initially implemented bar coding, it has subsequently been able to introduce RFID in specific areas where the technology's greater flexibility produces additional benefits and savings.



Electronic Invoice

What is it?
This function is an efficient electronic method for suppliers to send invoices to hospitals.

How health care provider benefits
Compared to paper-based invoices, electronic invoices require less administrative work and tend to contain fewer data errors. Implementation of electronic invoicing enables accounts payable staff to shift their focus from searching for discrepancies to finding solutions.

Before

Suppliers created paper invoices and sent them to the hospital by mail or fax. Prior to authorizing payment, the hospital's accounts payable staff physically conducted a three-way match to reconcile the paper invoice with the paper purchase order and warehouse receipt.

After

Suppliers generate electronic invoices from stored templates and transmit them to the hospital. With a few mouse clicks, the hospital's accounts payable staff save the invoices to a computer database. Electronic invoices can be used in an automated three-way matching process that seamlessly reconciles the invoice with an electronic purchase order and electronic warehouse receipt.

Implementation considerations

- Health care suppliers in Ontario are still in the early stages of adopting electronic invoicing. Of the more than 200 suppliers that the e-Supply Chain Project reviewed, only 15 had already implemented electronic invoicing that provided the level of integration that hospitals require.
- In general, health care suppliers are interested in electronic invoicing, but they are waiting for more customers to implement the function before implementing it themselves.
- The more accurate the item master file, the more likely the purchase order and invoice will match to support three-way matching.
- Some e-commerce gateways (and suppliers via their websites) provide online invoice presentment capabilities. While the invoicing process is automated from the supplier side, the hospital can only view and print the invoice. A drawback of this form of e-commerce is it does not support electronic three-way matching.
- Electronic invoicing in combination with electronic funds transfer can provide the hospital with the ability to pay invoices earlier and take advantage of early-pay discounts.

Benefits to date

- HMMS has successfully implemented electronic invoicing with six suppliers.
  - The efficiencies generated on an ongoing basis have saved an estimated one fulltime staffing equivalent or $49,000 a year.
  - Additional savings have been realized through reduced paper use and repurposing of physical storage space.
  - More than 90 per cent of electronic invoices received are being used in electronic three-way match, reconciling the invoice with the electronic paper purchase order and warehouse receipt.
- TOH has implemented electronic invoicing with seven suppliers and now receives more than 10,000 electronic invoices annually.
- In its first year after implementing electronic invoicing, SickKids began receiving electronic

invoices from three suppliers. This resulted in a reduction in manual processing of approximately 3,100 paper invoices totalling 17,000 lines.

Lessons learned

- Hospital information management departments must work closely with finance departments to provide accounts payable staff with the necessary technology interfaces and system integration expertise.
- Many suppliers have difficulty implementing electronic invoicing due to billing issues involving matters such as tax codes, credits and shipping charges. In a manual environment, staff are able to create workaround solutions, but these issues can be extremely difficult to solve in an automated environment.
- At Plexxus, several months of investigation and corrective work were needed to implement this function with a limited number of suppliers.
    - In examining the electronic invoices being sent by one of its key suppliers, several causes of mismatches were discovered. The supplier was sending invoices for:
        - procurement card purchases (which required no invoice as they were pre-charged to a procurement card);
        - non-standard purchase orders that should not have generated an electronic invoice;
        - special handling fees added to orders, resulting in duplicate invoices;
        - consignment orders quoting differing purchase-order line numbers.
- All of the issues were eventually resolved, but this experience provides an indication of the challenges involved in implementing electronic invoicing.

Electronic Funds Transfer and Notification

What is it?

Electronic funds transfer (EFT) is an integrated mechanism for instructing financial institutions to transfer funds to suppliers and provide them with notification of payment.

How health care provider benefits

Benefits include a reduction in the labour costs associated with paper cheque processing and bank reconciliations and lower expenditures on supplies such as cheques, envelopes and postage.

Also, the elimination of time-consuming manual processes means supplier payments can be made more quickly following invoice receipt. As a result, the hospital has increased opportunity to benefit from early-payment price rebates.

EFT is also a secure technology that reduces the incidence of cheque fraud.

Before

Hospital accounts payable staff wrote paper cheques for all supplier invoices due by the end of the next payment period. They then printed the suppliers' addresses on stamped envelopes, inserted the cheques in the envelopes and sent the letters by mail to the suppliers.

After

Upon receiving a supplier invoice and matching it against the purchase order and inventory received, the hospital instructs its bank via secure electronic message to transfer the amount owed to the supplier's bank account on a specified date. After transferring the money, the bank notifies the supplier by EDI message, e-mail or electronic fax.

Implementation considerations

Supply chain staff need to work with their accounts payable department to reap the benefits of implementing EFT.

Education on the latest EFT technology may be required to assure the hospital's accounts payable department that EFT is a secure technology and that implementation of EFT will not disrupt the hospital's cash flow.

Benefits to date

- Since introducing EFT in 2004, HMMS has generated annual savings of more than $108,000 through labour and operational cost savings.
  - EFT was expanded to include payments to staff to reimburse expenses, and this has been well received.
  - Calls from suppliers and staff checking on the status of payments and reimbursements have fallen significantly.
- At Plexxus, EFT has been enhanced or implemented at UHN, Mount Sinai Hospital and Sunnybrook Health Sciences Centre. Campaigns to increase the number of suppliers paid electronically have been launched at all three hospitals with growing participation.
  - More than 650 suppliers have been EFT enabled across Plexxus' four participating hospital organizations, resulting in more than 10,000 fewer manually processed payments per year.
  - The value of EFT payments is approximately $30 million per month, representing 15 to 25 per cent of the hospital organizations' total payments to suppliers.
- As of March 31, 2007, TOH had established more than 625 suppliers (representing about 60 per cent of total supplier payments) on EFT with notification of payment. This has resulted in 11,000 fewer manually processed payments per year.

Lessons learned

- EFT can be used to make payments not only to suppliers but also to employees, internal departments and other organizations.
- Suppliers that subscribe to lockbox services may not perceive an advantage in switching to EFT, since a lockbox already offers many of the benefits of EFT. (Lockbox services receive manual cheques from payers, convert them to electronic payments and forward them to suppliers.)
- TOH found that having payments managed by the bank provided the best economies of scale.
- Before deploying EFT, it is highly recommended that hospitals engage an external auditing firm to test the method's security.
- Hospitals can negotiate with banks to receive improved rates and support in encouraging suppliers to become activated on the system.
- If a health care organization is considering switching banks, evaluations of the services provided by candidate banks should take into consideration EDI capability and associated transaction processing costs.

Document Imaging (Invoice Scanning)

What is it?

Document imaging is the process of scanning paper documents such as paper invoices and converting them to digital images. The digital images are then saved in a storage device such as a computer hard drive or compact disk. Copies of the stored documents can be easily retrieved by any authorized hospital employee.

How health care provider benefits

This streamlined system for capturing, storing and retrieving electronic images of paper documents can save hospitals thousands of dollars annually. Benefits flow from labour savings and reduction in the use of paper and physical storage space.

Some storage systems permit multiple users to view a document simultaneously, which allows staff to resolve payment issues more efficiently. Also, hospitals can back up their electronic files in offsite storage facilities to support continued operations following a disaster.

Implementation considerations

- To ensure the security and integrity of the system, create authorized access from document imaging system to the account payable system.
- Provide secure web access for authorized end users to view transaction documents.
- Work closely with internal/external auditors to validate system reliability, security and adherence to accounting requirements. This will include creating a workflow process for scanning and managing documents before eliminating hard copies.

Before

After processing supplier payments, the hospital's accounts payable department packed the original paper invoices in boxes and placed them in onsite storage. If a question arose at a later date about a payment, someone from accounts payable would have to physically locate the box and retrieve the invoice. After the issue was resolved, somebody would then have to return the invoice to storage. The process was time consuming and created multiple opportunities for error. On top of this, the hospital did not make backup copies of its invoices, causing concern about the impact a disaster such as fire or flooding could have on its accounts payable function.

After

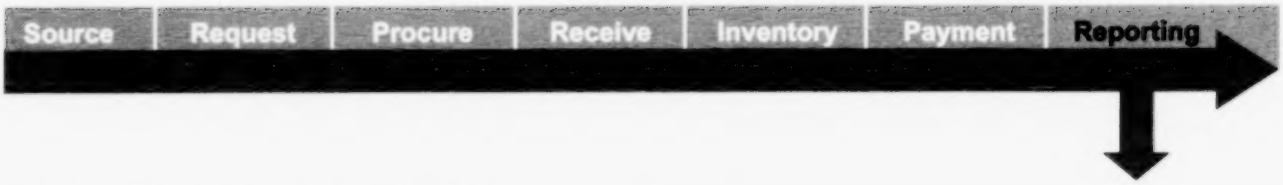
The hospital scans incoming paper invoices and uses the images to facilitate three-way matching and payment approvals. Staff can go online anytime to view electronic copies of the original supplier invoices. Multiple users are able to access documents simultaneously. The scanned information is stored onsite in a searchable database. A backup database stored offsite can be accessed in the event of disaster.

Benefits to date

- HMMS has realized savings of $54,000 annually through implementation of a new document management system for invoice scanning. Specific benefits include:
  - a reduction in administrative time spent filing and retrieving, allowing staff to focus on more strategic work;
  - a savings in physical storage space -- since the use of digital invoices eliminates the need to retain original paper invoices for seven years.

Lessons learned

- In determining the business case for invoice scanning, hospitals must factor in the cost of the staff time required to scan the documents and the cost of implementing bar code labels.
- Hospitals should consider purchasing a robust document management system that can be used for other applications such as scanning purchase order attachments, packing slips, contracts and business correspondence.
- Contracting with a system vendor for a set number of document scans per year can be less expensive than paying on a cost-per-scan basis.
- Document retrieval is faster and more flexible if the system incorporates optical character recognition (OCR) software.



Distributed Information Through Business Intelligence

What is it?
Business intelligence refers to the tools and techniques organizations use to access and analyze data, including supply chain data.

How health care provider benefits
Through implementation of business intelligence software, hospitals gain an enhanced ability to manage their supply chain processes and generate performance reports as requested by managers, auditors and government. The software supports:

- functions for aggregating data from multiple sources, including suppliers;
- ability to create real-time digital dashboards for performance monitoring;
- online data-mining solutions with analytical tools, graphical reporting and e-mail notification;
- ability to develop balanced scorecards providing measurements of supplier performance. This information helps the hospital during contract negotiations with suppliers and generally supports better decision making in all aspects of the hospital's supplier relations.

Implementation considerations
Many business intelligence systems are available for licence or purchase. The cost varies depending on factors such as the number of functions, licensing arrangements and service quality. Health care providers should explore a wide range of system options to ensure they are getting the best solution to fit their needs.

If the use of business intelligence systems by employees across an organization is not coordinated, unnecessary redundancies in data capture and analysis may result. Hospitals are encouraged to implement policies and processes for monitoring and managing system use.

Before

Hospital administrators did not have a clear picture of how their organizations' supply chains were performing, where the potential problems lay and what the opportunities were.

After

Hospitals are collecting accurate data in all areas of their supply chains and monitoring performance in real time. Using leading technologies and practices, they are generating reports, analyzing results, projecting outcomes and, ultimately, making decisions that are advantageous to their organizations. The result is a virtuous circle of continuous improvement that is allowing hospitals to enhance their supply chains despite a reduced investment in money and labour. The savings generated through this process are being redirected to initiatives that improve patient care.

The Secretariat has worked with hospitals to identify 48 performance measures and 20 standards to help drive continuous supply chain improvements. The results are published in "Performance Measurement, A Report by the Hospital Supply Chain Metrics Working Group." Hospitals implementing business intelligence systems — and, indeed, any supply chain improvements — should consider adopting the metrics identified by that report.

Benefits to date

- HMMS has generated annual savings of about $850,000 through business intelligence-supported improvements in areas such as standardization, contract compliance, inventory management and resource utilization.

- Performance across the supply chain is now simple to track and analyze.
- Timely, accurate spend data are easy to access.
- Numerous reports and scorecards have been developed and are accessible online. They focus on areas such as buyer productivity, vendor performance, contract compliance, supply usage, payment discounts, employee sick time, warehouse productivity, inventory trending, requisitioning, contract register, month-end balancing, invoice matching, cheque register and non-catalogue purchase history.
- Reporting by exception and use of scorecards has allowed HMMS to more easily identify opportunities for continuous quality improvements.

- SickKids has increased access to reporting information in three distinct areas of its supply chain operations.
  - The organization's e-commerce gateway is used to distribute information such as quarterly reports that highlight critical trends and clearly identify opportunities for improvement.
  - The software implemented as part of the supply replenishment project provides easier access to supply cart data; the new system recommends inventory modifications based on fulfillment times and consumption history.
  - The vast majority, 98 per cent, of SickKids' supply contracts are now managed through one central enterprise resource planning (ERP) system. Previously, four separate applications were required. This improvement is the result of changes to the organization's ERP system functionality as well as enhancements to its reporting and business processes.
- At HRSRH/TDH, easy access to supply chain information is saving time and money.
  - The number of clinician inquiries to supply chain staff has fallen. Both clinicians and supply chain staff now have more time to focus on other priorities.
  - Availability of performance metrics allows for identification of opportunities to further improve supply chain efficiencies.
  - Audit tools enable monitoring of staff compliance in the use of cost-saving technologies and processes such as electronic requisitions and approvals.

Lessons learned

- Performance metrics scorecards are an excellent tool for tracking variances to targeted outcomes or benchmarks.
- If the business intelligence system has online access, it's easier for employees throughout the organization to log on and use it.
- Regular database maintenance, including periodic re-indexing of the data, helps ensure optimal system performance.
- End-user training prior to launch is important. The training curriculum should include reviews of basic business processes, data collection methods and ways to interpret results.
- After implementation, regular meetings with end users provide the opportunity to solicit feedback, share ideas and supply additional training.

Appendix A: Glossary of Terms and Acronyms

Bar Code
A machine-readable representation of information (usually dark ink on a light background to create high and low reflectance) that is converted to 1s and 0s). Originally, bar codes stored data in the widths and spacings of printed parallel lines, but today they also come in patterns of dots, concentric circles and text codes hidden within images.

EDI
Stands for electronic data interchange. A set of standards for structuring information to be exchanged electronically between two or more trading partners (e.g., a hospital and supplier).

ERP
Stands for enterprise resource planning. Large software systems used by large businesses to manage and plan business resources, including human resources, payroll, customer accounts and supply chain.

Healthcare Supply Chain Network (HSCN)
A Canadian network of health care supply chain provider and supplier professionals.

MMIS
Stands for materials management information system. A system for gathering the supply chain data and other information that managers need to operate a business.

OntarioBuys
A program established by the Ontario government's BPS Supply Chain Secretariat to facilitate and accelerate the widespread implementation of integrated supply chain management best practices in Ontario's broader public sector.

Physician Preference Cards
A tool that captures physician preferences and documents these preferences in a format that is accessible to and used by the frontline staff who work with physicians on a day-to-day basis in coordinating care for their patients.

RFID
Stands for radio-frequency identification. A method of transmitting information using radio waves. RFID systems typically consist of a tag that contains information identifying an item or specifying a condition or state. A reader communicates with the tag and reads the information programmed into its memory.

Supply Chain Leading Practice
Any novel application, process, technology or people practice that enhances the efficiency or effectiveness of an organization and results in a significant, measurable change that improves performance.

UPN
Stands for universal product code. A UPN is intended to unambiguously identify medical/surgical products in the supply chain. Each product at all levels of packaging will be assigned a unique UPN, consisting of either the HIBC-LIC or UCC SCC-14 primary data structure.

XML
Stands for extensible mark-up Language. XML uses syntax tags to identify various types of data in a file. XML makes it easier for various programs to extract data because the tags conform to particular models.

Appendix B: e-Supply Chain Project Sites

Six health care organizations brought the concept of the e-Supply Chain Project to the Ontario government. The organizations developed their proposal and funding request in cooperation with the Hospital Supply Chain Network (HSCN), a Canadian industry body dedicated to improving health care supply chain efficiency and effectiveness. Mike Rosser, General Manager of HMMS, served as project chairman. Robert Bell, a supply chain consultant with experience in health care, was project manager.

The Hospital for Sick Children (SickKids)

The Hospital for Sick Children (HSC), affiliated with the University of Toronto, is Canada's largest centre dedicated to improving children's health.

Total Supply Chain Spending in 2006: $57 million

Project Priorities:

- Centralized Electronic Catalogue
- Contract Management
- Punch-Out to Supplier Catalogue
- Electronic Requisitioning with Workflow with Approvals
- Point-of-Use Data Capture
- Electronic Purchase Order
- Electronic Order Acknowledgement
- Advanced Ship Notice
- Warehouse and Inventory Management Automation
- Bar Coding
- Electronic Invoice
- Electronic Funds Transfer

Project Lead: Wayne Coros, Director of Purchasing and Materials Management
Executive Sponsor: Angela Holtham, Vice President of Finance and Chief Financial Officer

The Ottawa Hospital (TOH)

The Ottawa Hospital is a 1,130-bed academic health sciences centre with three separate campuses. TOH is affiliated with the University of Ottawa. The Ottawa Health Research Institute is the research arm of the hospital.

Total Supply Chain Spending in 2006: $191 million

Project Priorities:

- Centralized Electronic Catalogue
- Punch-Out to Supplier Catalogue
- Electronic Requisitioning with Workflow and Approvals
- Electronic Purchase Order
- Electronic Order Acknowledgement
- Auto PO and Scheduling
- Electronic Invoice
- Electronic Funds Transfer

Project Lead: Guy Lemay, Director of Purchasing
Executive Sponsor: Cameron Love, Vice President of Facilities, Planning and Support Services

Shared Healthcare Supply Services (Plexxus)

In April 2005, Shared Healthcare Supply Services (SHSS), which provided supply chain services to four major Toronto hospital organizations (Mount Sinai Hospital, University Health Network, Sunnybrook Health Sciences Centre and Women's College Hospital), signed on as one of the project sites participating in the e-Supply Chain Project. Subsequently, in March 2006, SHSS was acquired by Plexxus, a member-owned back-office service provider to 12 major health care organizations.

Total Supply Chain Spending in 2006: $355 million

Project Priorities:

- Centralized Electronic Catalogue
- Contract Management

- Punch-Out to Supplier Catalogue
- Electronic Requisitioning with Workflow and Approvals
- Clinical Consumption Ordering
- Electronic Purchase Order
- Electronic Order Acknowledgement
- Electronic Invoice
- Electronic Funds Transfer

Project Lead: Don Cummer, Director of Integrated Technology, Plexxus
Project Sponsors:

- Kevin Empey, Executive Vice President, Clinical Support and Corporate Services, University Health Network
- Joan Sproul, Senior Vice President of Finance, Mount Sinai Hospital
- Wendy Gilmour, Vice President of Clinical Support Services, Sunnybrook Health Sciences Centre

Healthcare Materials Management Service (HMMS)

HMMS was created in 1997 as a joint venture between London Health Sciences Centre (LHSC) and St. Joseph's Health Care (SJHC) to integrate and consolidate purchasing, accounts payable, inventory management and logistics for the London hospitals. HMMS now provides similar services to 14 other health care facilities in southwestern Ontario.

Total Supply Chain Spending in 2006: $190 million

Project Priorities:

- Centralized Electronic Catalogue
- Contract Management
- Punch-Out to Supplier Catalogue
- Electronic Requisitioning with Workflow and Approvals
- Point-of-Use Data Capture
- Electronic Purchase Order
- Electronic Order Acknowledgement
- Auto PO and Scheduling
- Advanced Ship Notice
- Package Tracking
- Warehouse and Inventory Management Automation
- Bar Coding
- Electronic Invoice
- Electronic Funds Transfer
- Invoice Scanning
- Distributed Information Through Business Intelligence

Project Lead: Mike Rosser, General Manager of HMMS
Executive Sponsor: Jim Flett, Integrated Vice President and Chief Financial Officer, London Health Sciences Centre and St. Joseph's Health Care

Hôpital regional de Sudbury Regional Hospital/Timmins and District Hospital (HRSRH/TDH)

In northern Ontario, OntarioBuys worked with an existing health care consortium, North East Ontario Network, to support supply chain processes at the Hôpital régional de Sudbury Regional Hospital (HRSRH) and Timmins and District Hospital (TDH).

Total Supply Chain Spending in 2006: $64 million

Project Priorities:

- Centralized Electronic Catalogue
- Contract Management
- Electronic Requisitioning with Workflow and Approvals
- Electronic Purchase Order
- Electronic Order Acknowledgement
- Auto PO and Scheduling
- Warehouse and Inventory Management Automation
- Bar Coding
- Electronic Invoice
- Electronic Funds Transfer
- Distributed Information Through Business Intelligence

Project Lead: Andrew Kosar, Team Lead, Financial Applications, HRSRH
Executive Sponsor: Ben Petersen, Vice President Finance and Chief Information Officer, HRSRH

Shared Services West (SSW)

Shared Services West Regional Materials Management is owned and operated by The Credit Valley Hospital, Halton Healthcare Services, Trillium Health Centre in Mississauga and William Osler Health Centre in Brampton. The organization was created in 2001 to provide logistics, purchasing, contract management and equipment procurement services to the four hospitals to enhance patient care, improve quality of service and provide best value. In 2006, Headwaters Health Care Centre in Orangeville became a customer of SSW.

Total Supply Chain Spending in 2006: $179 million

Project Priorities:

- Electronic Requisitioning with Workflow and Approvals
- Point-of-Use Data Capture
- Clinical Consumption Ordering
- Electronic Purchase Order
- Electronic Order Acknowledgement
- Bar Coding
- Electronic Invoice
- Electronic Funds Transfer

Project Lead: Philip Smith, General Manager, Shared Services West
Executive Sponsor: Douglas King, Vice President, The Credit Valley Hospital

Appendix C: Getting Started

The following is a synopsis of the key steps the project sites undertook prior to implementing their supply chain improvement initiatives.

Project Lead
The first step for each site was the appointment of a Project Lead.

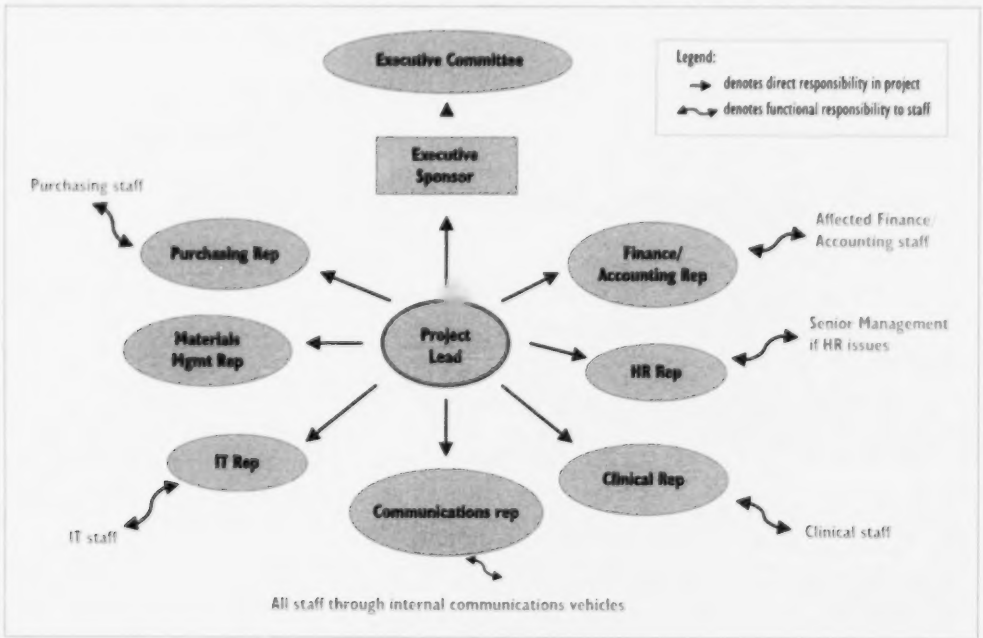
- Project Leads were typically director-level staff with in-depth understanding of the health care sector, supply chain management experience and background in leading cross-divisional initiatives.
- The Project Leads from the six project sites worked collaboratively to identify opportunities for improving the hospital supply chain.
- The Project Leads were responsible for coordinating implementation of new technologies and processes at their project sites.

Executive Sponsor
Next, the project sites appointed a senior hospital employee as an Executive Sponsor. The role of the Executive Sponsor was to provide a direct channel to the executive boardroom, champion the initiative across the organization and help overcome problems identified by the Project Lead.

Project Working Group
One of the first tasks of each Project Lead was the formation of a project working group, with representation from all relevant functional areas. When deciding what constituted "relevant," the Project Leads considered functional areas affected by the initiative, both directly and indirectly; employee groups that in the past had been resistant to change; and employees or employee groups considered champions of change. Representatives from human resources and communications were added to the working group on an as-needed basis, depending on the amount of change management required to support the initiative.

The project site found that identifying supportive employees in all functional area and appointing them as project champions was critical. Through their engagement, these employees helped the Executive Sponsor build support for the improvement initiatives. As well, they provided the project working group with a means of monitoring attitudes and compliance throughout the organization. This led to more effective communications and problem solving. See Figure 2 for the reporting responsibilities of project team members.

Figure 2: Basic organizational structure and reporting responsibilities of project working group representatives.



Defining the Opportunity

At each project site, the working group established a schedule of regular meetings and began defining its project priorities. The first step in defining priorities was to review the state of the existing supply chain and formulate a vision for a future state. During this process, some project sites sought advice from a panel of e-supply chain experts. The Project Lead was responsible for creating the panel, with the support of the Executive Sponsor, as required.

The panel experts included e-procurement technology vendors, e-commerce gateway vendors, representatives of group purchasing organizations, hospital staff from other health care facilities with experience implementing supply chain improvements, and suppliers of hospital products — some with e-commerce capabilities and some without.

Following the research and data analysis phase, the working groups were ready to identify the opportunities for supply chain improvements and recommend specific initiatives. Factors that influenced this decision making included the complexity of the undertaking; the ability to achieve quick wins; the nature of the long-term benefits; and the timeframe for realizing these benefits. The Project Leads involved their Executive Sponsors in this process and, in some cases, consulted with their organizations' senior management committees.

Additionally, each working group conducted a cost-benefit analysis of its organization, with emphasis on its supply chain.

At the conclusion of this process, the working groups were ready to draw up their project plans. Each plan included the following:

- detailed estimates of costs (e.g., hardware, software, training, external resources, communications and general expenses);
- detailed estimates of savings (i.e., hard, soft with examples, one-time and ongoing);
- a detailed project timeline with key milestones noted;
- an explanation of project governance and reporting relations;
- a detailed list of project deliverables;
- a comprehensive risk analysis;
- performance metrics to track success;
- a communications plan;
- a vision statement;
- a clear list of what was out of scope of the project.

For multi-hospital organizations, participating facilities were identified, and explanations were provided for how the facilities would work together.

Supplier Relations

Effective supplier relations are vital to the success of supply chain modernization initiatives. For the hospitals' investments in new technologies and practice changes to pay off, a critical mass of suppliers must have already implemented parallel compatible improvements in their technologies and processes.

The project sites identified their top suppliers by transaction volume and developed a strategy to inform and engage them. An online survey of supplier e-commerce capabilities and a live information session about the project were used to gather information on supplier issues and the challenges suppliers would encounter in implementing the new technologies and adapting their organizations.

Through this process, the individual project sites were able to identify which of their suppliers supported them and would try to meet their implementation deadlines; which supported them but could not implement the necessary changes until a later date; and which were reluctant to change. This information proved invaluable as the project sites developed their improvement plans and implementation schedules.

Communications

Effective communications with suppliers and internal audiences were also determined to be a critical success factor. Communications vehicles used to reach suppliers included:

- an online survey;
- multiple live, open-invitation information sessions;

- a newsletter issued by HSCN as the project coordinator;
- information posted on the HSCN website;
- newsletters issued by some of the individual project sites;
- one-on-one supplier meetings.

The objectives of the individual project sites in communicating with their suppliers were to inform them about their overall improvement strategies, the specific technologies and practice changes they were implementing, and the dates when suppliers were expected to be compliant.

Communications vehicles used to reach internal audiences included:

- existing hospital newsletters;
- staff information sessions.

The objectives in communicating to staff were to create organizational support and promote achievement of milestones. The project sites felt it would be important to provide opportunities for staff to supply feedback. This would help the project working groups uncover potential barriers early and solve them efficiently.

The project site communications plans also included a process for gathering performance data and writing a closure report to meet the requirements of the Ontario government's transfer payment agreements.

Appendix D: Enabling Technologies

Health care organizations must implement key enabling technologies to support supply chain automation.

Enterprise resource planning (ERP)

An ERP is fundamental to automated supply chain management. It allows the integration of the health care provider's various departments onto a single system that users can access from multiple locations across the organization. Most hospitals already have an ERP system and/or a supply-chain-specific materials management information system (MMIS), so the object is to ensure that the installed system supports the organization's desired e-commerce capabilities. If specific capabilities are lacking, third-party vendors may be able to fill the gaps with "bolt-on" software solutions. Hospitals that do not have an existing ERP system, or are planning to acquire a new ERP system, should consider their supply chain and e-commerce objectives in making the selection.

E-commerce software

E-commerce software automates and integrates a hospital's manual supply ordering functions. Some solutions also offer electronic requisitioning with capabilities to support the workflow and approval processes. There are many vendors of e-commerce software.

Before choosing a vendor, hospitals should first:

- Determine their e-commerce objectives vis-a-vis the following list of core e-supply chain processes:
  - centralized electronic catalogue;
  - electronic requisitioning;
  - electronic purchase order;
  - electronic order acknowledgement;
  - advanced ship notice;
  - electronic invoice;
  - electronic funds transfer.
- Identify their ERP/MMIS platform, or determine what platform they will implement, and find out what software is compatible with the existing or future platform.
- Consult with hospitals that have the same ERP/MMIS platform and software under consideration to learn about potential problems encountered during installation and operation.
- Identify their integration needs. This is relevant for hospitals building on an existing ERP/MMIS platform. If elements such as purchase order acknowledgements cannot be easily integrated, it may be necessary to develop workarounds to ensure the information gets to the buyers/requisitioners in a timely, accurate fashion.
- Estimate startup costs (hardware/software/consulting/etc.), ongoing transaction costs (if applicable) and annual fees or other service charges.
- Undertake an RFI/RFP using a public tendering system such as bidnavigator.com or MERX that will generate responses from multiple vendors offering a range of different e-commerce solutions.
- Consider using an outsource e-commerce provider rather than building an in-house e-commerce platform. This solution could result in faster start-up and may be preferred by health care providers with limited internal IT expertise.
- Review the e-commerce software platforms offered by the vendors that responded to the RFI/RFP. This involves:
  - assessing the technology standards that the platforms support. Most suppliers with installed e-commerce platforms use EDI-only technology. If the hospital selects an XML-only platform, as an example, it may have to pay a translation fee to the gateway for each transaction;
  - evaluating the platforms on the basis of their ease of use. Hospital staff are more likely to support new software technologies that are intuitive and simple to operate;

- exploring the platforms' support for business intelligence reporting. Even if a health care organization does not have immediate plans to implement business intelligence reporting, there is a strong likelihood that it will want to do so in future.

If the hospital's ERP/MMIS platform does not have all the e-commerce functionality that the hospital is looking for, then the hospital should investigate solutions offered by third-party vendors, including e-commerce gateways. Typically, the best and most cost-effective solution in the long run is to "buy before you build."

E-commerce gateway

The basic role of the e-commerce gateway, often referred to as the value-added network (VAN), is to receive purchase order data from the hospital's internal computer system using standard formats (e.g., EDI ANSI.X12) and transport it securely over the Internet or via dedicated phone line to the supplier. Gateways also offer e-commerce functions as value-added services. There are two principal e-commerce gateway vendors in Ontario with the wide range of functions required by health care providers. Other gateway vendors are working to establish themselves in the market.

Before choosing a vendor, hospitals should first:

- identify their ERP/MMIS platform, or determine what platform they will implement, and find out what vendor gateways are compatible with the existing or future platform;
- consult with hospitals that have the same ERP/MMIS platform and gateway under consideration to investigate potential problems and solutions encountered during installation and operation;
- find out which hospital products suppliers are established on the various vendor gateways (see Supplier Connectivity below);
- compare the lists of suppliers associated with the respective vendors to the hospital's own list of suppliers;
- investigate the business model, startup costs and ongoing fees associated with each vendor;
- investigate the potential of the gateways to link to one another, allowing hospitals and suppliers to conduct seamless e-commerce transactions even though they are affiliated with different gateways. (There is usually an additional cost associated with transactions conducted over linked gateways);
- take into consideration the costs incurred by suppliers to connect to the respective vendors as this could affect supplier participation over time;
- investigate the gateways' short-term and long-term plans for introducing new products and services. While a gateway may be a good fit for a hospital today, it might not be suitable in the future as the hospital's needs expand and increase in complexity.

Bar coding/RFID

An automatic identification system such as bar coding or RFID can significantly enhance a hospital's materials management processes, including point-of-use replenishment, package tracking, procedure costing, traceability of items such as prostheses, and optimization of working capital investment. The advantages of bar coding include its lower cost and wide user base.

RFID allows greater automation of the data-collection process. However, this technology is newer, more expensive and relatively untested in the hospital sector.

Business intelligence reporting

Business intelligence reporting tools enable hospitals to access, analyze and share information within and between departments. This enhances understanding departmental performance and allows hospital executives to make better decisions.

Technology standards

Electronic data interchange (EDI) is an established technology standard in the Canadian health care sector and is expected to be in use for the foreseeable future. New standards continue to emerge, but they may not be directly compatible with older MMIS systems. Extensible Markup Language (XML), one of the more popular new standards in use, does not deliver significant business value over EDI.

Supplier connectivity

A small group of suppliers is connected to both principal e-commerce gateways. A larger group is connected to one of the two principal gateways. But most suppliers — particularly those that specialize in low-volume items — have yet to establish a gateway connection. These suppliers have adopted a wait-and-see stance due to the costs associated with startup and ongoing usage. Their strategy is to continue processing orders manually until one of the gateways emerges as the industry standard or until a significant number of their customers request e-commerce connectivity. (Hospitals will have greater leverage persuading suppliers to adopt e-commerce platforms if they introduce their requests during contract negotiations. See Appendix E for suggested contract wording.)

Appendix E: Suggested Wording for RFPs and Contracts

The health care organizations that participated in the e-Supply Chain Project drafted the following two clauses for use in requests for proposals, requests for quotes and supplier contracts. This wording is intended to be used as a basic template; health care organizations are free to modify the language to meet their specific needs. It was the hope of the e-Supply Chain Project members that widespread adoption of these contract stipulations would promote supplier implementation of e-commerce functions and drive supply chain modernization across the Ontario health care sector. Currently, the e-Supply Chain Project participants use the clauses in most of their supplier RFP/RFQs and product contracts.

This clause would go in all RFP/RFQs

E-Commerce Transaction Capability/ Electronic Enablement

The Bidder [should, must, shall] provide information as to the:

a) List of its current capabilities and available functions with respect to the ability to communicate and process transactions through an electronic data interchange, which should include, but shall not be limited to electronic data exchange through a value added network, internet business-to-business portals, or direct electronic interaction over the internet; and

b) Bar coding standards and protocols that the Bidder currently uses with the equipment or products sought under this RFP.

[Optional]

c) Bidder should identify any e-commerce usage discounts or incentive plans to the Hospital and attach it to [pricing schedule]. Bidder should specify percentage discount applicable and how it is realized from the Bidder. (Example 1 per cent discount from realized sales paid monthly).

This clause would go in all product contracts

Electronic Commerce

a) The Supplier has the capability in their business systems and technologies to allow the Hospital to electronically process orders and transactions using [name of e-commerce gateway] in the following areas [identify transactions]. The Supplier also commits to further develop their capabilities in this area by [e.g. direct or indirect integration to preferred eCommerce gateway, having 810 or 832 capability] and will have said capability live and usable by [specify date].

[Optional]

b) Additionally, the Supplier should provide an e-commerce usage discount to be calculated as, [insert formula].

© Queen's Printer for Ontario, 2007
ISBN 978-1-4249-5363-9 (Print)
ISBN 978-1-4249-5364-6 (HTML)
ISBN 978-1-4249-5365-3 (PDF)

Ce rapport est disponible en français